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MONTANA STATE HIGHWAY DEPARTMENT

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ECONOMIC ANALYSIS
OF
SIDNEY TO CIRCLE ROUTE
AS
PROPOSED ADDITION
TO
FEDERAL AID PRIMARY SYSTEM

June 1950

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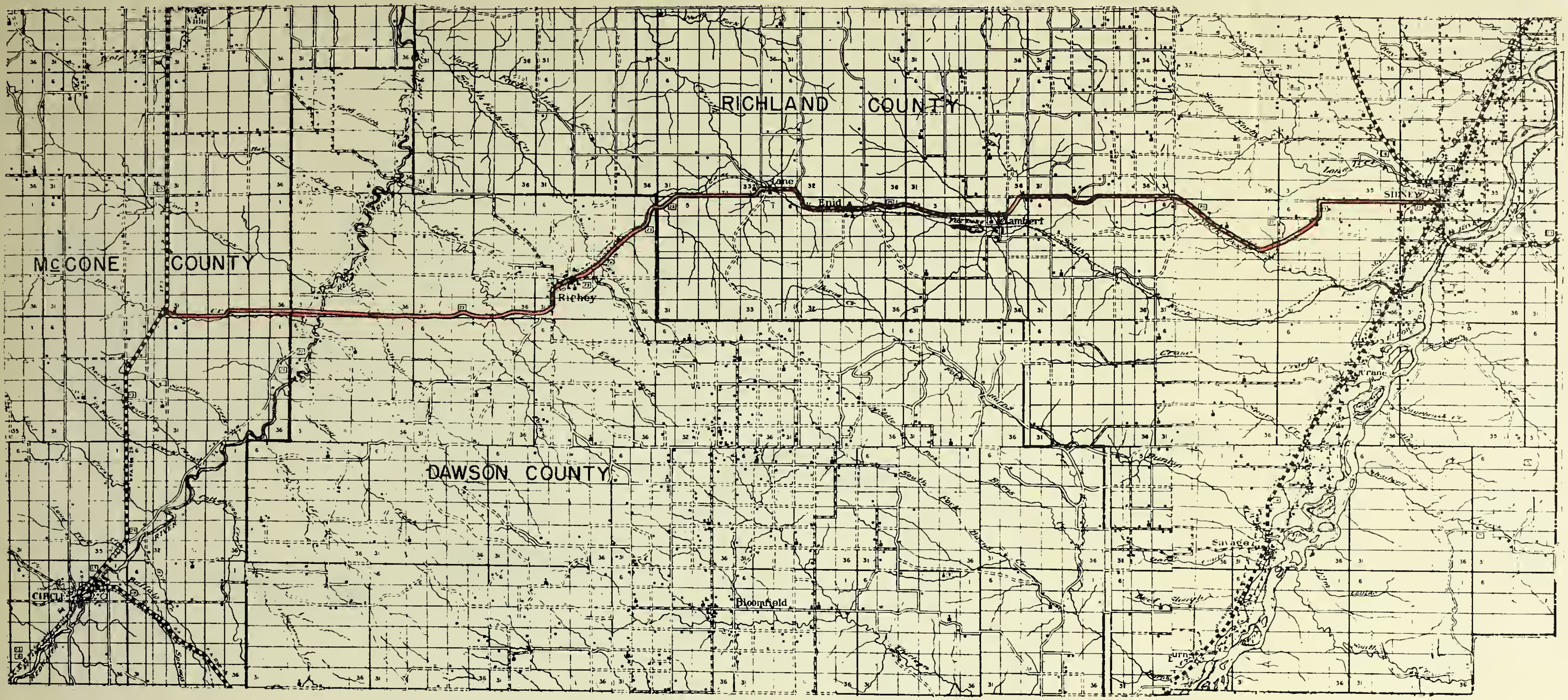

PROPOSED

CIRCLE—SIDNEY

FEDERAL AID PRIMARY ROUTE

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ECONOMIC ANALYSIS OF PROPOSED ROUTE FROM SIDNEY TO CIRCLE

FOREWORD

This report has been prepared for the purpose of analyzing the economic and financial merit of constructing a route from a junction with FA Route No. 20 near Sidney to a junction with FA Route No. 25 north of Circle. The route would provide an eastward extension of the Montana Central Highway from Circle to Sidney.

Detailed information has been collected concerning the estimated construction and maintenance costs, anticipated traffic, and value of benefits to the traffic that would use the route. A comparison is made between overall annual cost and annual revenue to in order to determine whether the proposed route would produce sufficient revenue to pay the annual amortized cost. A further comparison is made between the value of savings to the traffic and the annual costs in order to determine whether a favorable balance exists.

DESCRIPTION OF ROUTE

As shown on the map in the frontispiece, the proposed route commences at a point on FA Route No. 20 about .3 miles south of Sidney and proceeds westward over the approximate alignment of FAS Route No. 260 as far as Lambert. From Lambert the route follows the general alignment of county roads through Enid, Lane, Richey and Paxton to a junction with FA Route No. 25 at a point about 15 miles north of Circle.

Length of the present travelled way is about 75.5 miles. These county roads follow the existing topography with little attempt to reduce curvature or grade. A reconnaisance survey indicates that construction of the route to primary standards of alignment will reduce the length to 66 miles.

The area served by this route is predominantly grazing land in the western section with grain farms becoming more prevalent in the eastern section. Some very productive irrigated land borders on the valley of the Yellowstone River in the vicinity of Sidney. At present the region is served by the following FAS Routes: FAS Route No. 260 from Sidney to Lambert, FAS Route No. 254 from Richey to Glendive, and FAS Route No. 259 through Girard roughly parallels FAS Route No. 260 on alignment about 10 miles to the north. The Great Northern

R. R. operates a branch line that roughly parallels the proposed route from Sidney to Richey.

Being predominantly a dry land farming and stock grazing region, the population is comparatively light. Sidney and Circle, the principal controls for the route, are both county seats. Circle had a population of 685 at the time of the 1940 census and it is believed that there has been only a moderate growth since that time. Sidney is the county seat for Richland County and is the principal city in this section of the State. The 1940 census showed a population of 2978 persons, however, the local chamber of commerce estimates the present population at 6,000 including the environs. It is situated in the heart of a very productive irrigated area, is a livestock marketing center, and serves as a commercial center for a large portion of eastern Montana and western North Dakota.

Construction of this route would complete the eastern extension of the Montana Central Highway from Missoula through Great Falls, Lewistown, Circle and Sidney. An agreement of long standing between the states of Montana and North Dakota provides for construction of a link through Cathmere and vicinity, connecting Sidney with U. S. Highway No. 85 in North Dakota. Montana has completed its section of this road some time ago, and it is anticipated that North Dakota will complete the remainder in the near future.

TRAFFIC

Recent counts show that the present local traffic throughout the length of this route varies from a high of 141 vehicles per day at the eastern terminus to a low of 25 vehicles per day at the western terminus. The average for the entire route equals 58 vehicles per day. In accordance with present estimates, this traffic should increase about 50% on completion of a standard oiled highway, and it should experience an additional long term increase of about 25% during the service life of the roadway. Ten vehicles per day of present traffic using the Richey-Glendive road are expected to divert to this route upon completion. These vehicles would use only a portion of the route and the number would be reduced to 5 vehicles per day as an average for the entire route. The average of all future local and internally diverted traffic is estimated at 114 cars per day.

Construction of this route would provide about an 18 mile reduction in distance for traffic operating between Sidney and Circle and points beyond as compared with the present travelled way via Sidney-Glendive-Circle. An origin-destination survey was conducted at Sidney for the purpose of determining the volume of through traffic that could use the proposed route to advantage. This survey disclosed that 14 vehicles per day of through traffic could be expected to divert to the new route.

In addition to the present traffic, an estimated total of 13 vehicles per day of recreational traffic destined for the Fort Peck area would use the new route. The final completion of the North Dakota section east of Sidney should attract an additional volume of interstate traffic, however, since the new link would tap what is primarily north-south traffic, it appears that only a small amount could be expected to use the extension from Sidney to Circle. This traffic is estimated at 10 vehicles per day. Application of the future expansion factor of 25% would result in a total estimated future volume of through traffic of 46 vehicles per day.

The combined traffic is shown in the following table:

ESTIMATED AVERAGE DAILY FUTURE TRAFFIC

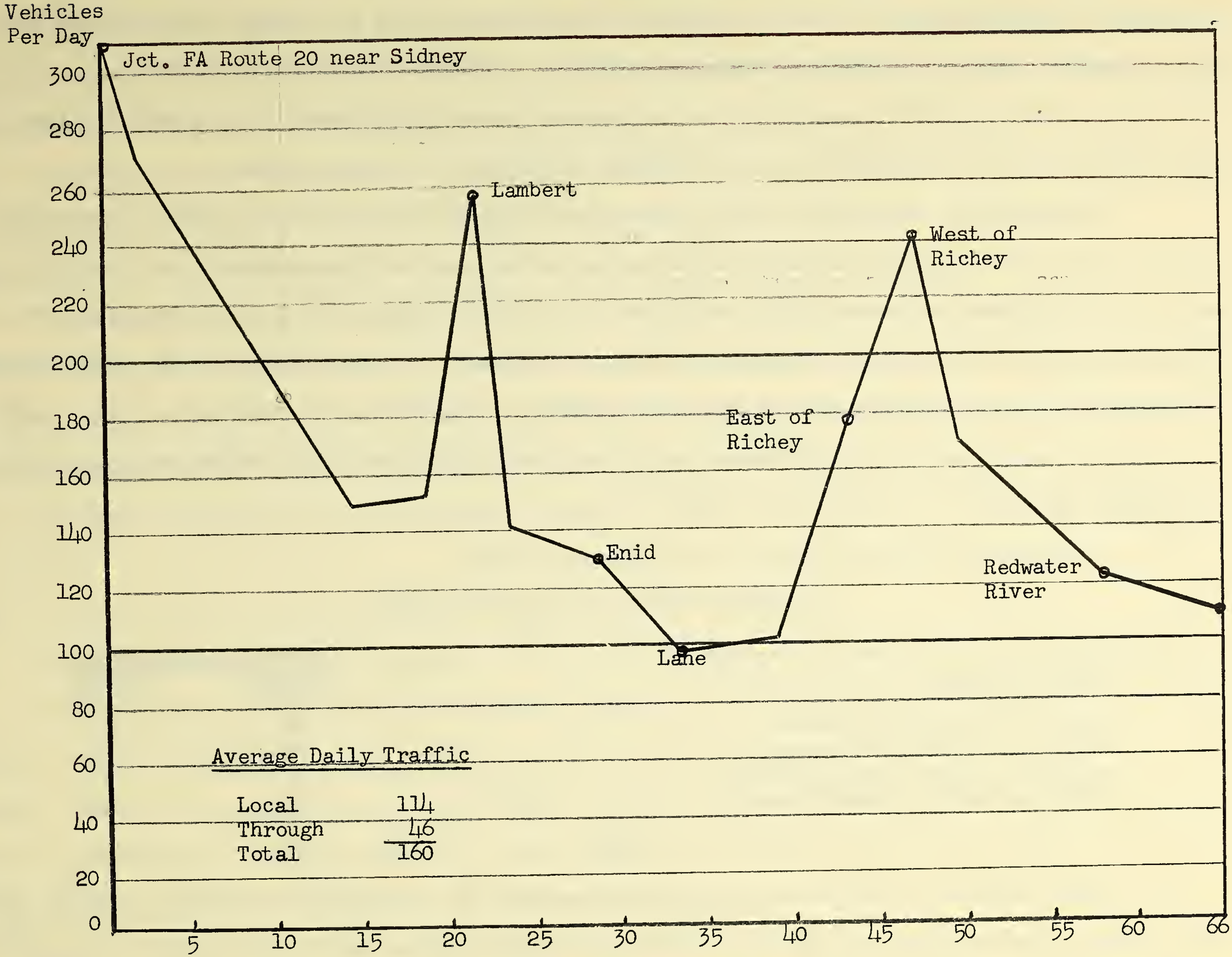
Type of Traffic	Average Daily Traffic Present	Average Daily Traffic Future
Local and internal diverted	58	114
Diverted traffic (O-D Survey)	14	17
Diverted traffic (Recreational)	13	16
Diverted traffic (North-Dakota)	10	13
Total	95	160

Local traffic is expected to average 64% passenger cars and 36% truck and bus. Diverted traffic should average 62% passenger and 38% truck and bus. The accompanying traffic profile shows the estimated future traffic.

TRAFFIC PROFILE OF SIDNEY TO CIRCLE ROUTE

ESTIMATED AVERAGE DAILY TRAFFIC

FROM 1950 TO 1980



Average Daily Traffic

Local	114
Through	46
Total	160

LENGTH OF ROUTE IN MILES

REVENUE FROM TRAFFIC

It is customary in analyses of this type to exclude from revenue calculations the amount of gasoline tax derived from diverted traffic since it is felt that this revenue is needed by the existing routes to maintain their own solvency. This same line of thought could also be applied to revenue from local traffic inasmuch as this revenue is already being received by the State Highway Department for support of State highway systems. Even with this off-system revenue, the State highway systems are not financially solvent, and to segregate this revenue to apply on the construction and maintenance costs of the new route would further reduce the solvency of the existing system mileage.

Consideration should be given on the other hand to the fact that this local traffic is paying fuel tax for gasoline consumed on county roads for which it does not receive any direct benefit or return. It is logical to expect that this revenue should be credited to the construction of a highway in this locality rather than applied towards meeting the cost of some existing road which may not be of direct benefit to this local traffic. There is also a certain amount of new revenue that would be received from new traffic generated by the construction of this route, principally from increased local traffic, recreational traffic and interstate traffic.

There are many ramifications to the problem of apportioning revenue between existing highways and new highways, however, in order to give favorable consideration to the route, all revenue is included regardless of origin or class of traffic. The following table shows the revenue computations based on present rates and sources:

ESTIMATED ANNUAL REVENUE FROM TRAFFIC

Type of Traffic	Average Daily Traffic	Average Annual Traffic	Annual Vehicle Miles	Per Vehicle Mile	Annual Revenue
Local and internal diverted traffic	114	41610	2,746,260	$0.009695	$26,625.00
Through traffic	46	16863	1,112,958	$0.011181	$12,445.00
TOTAL	160	58473	3,859,218		$39,070.00

In order to arrive at the net revenue that could be applied towards meeting the costs of this proposed route, it is necessary to deduct from the total shown above an amount equal to $9,895.00 which represents the amount of loss in present motor fuel tax. This loss would result from fuel savings realized by the motorist because of shortened distances, improved roadway surfaces and other factors. The net revenue would therefore equal $29,175.00 per year.

CONSTRUCTION COSTS

It is not expected that any extraordinary costs will be incurred in the construction of this route. Most of the terrain could be classified as gently rolling topography with very little rock excavation. A new bridge will have to be constructed over the Redwater River in the western section of the route, but the remaining drainage can probably be served by minor structures and culverts. Suitable base and surfacing material appears to be scarce in the western half of the route.

Estimated construction and maintenance costs for a 66 mile route are shown in the following table:

ESTIMATED CONSTRUCTION AND MAINTENANCE COSTS

Item	Cost
Roadway and bridges	$2,283,945.00
Engineering, R/W and administration	173,467.00
Sub-Total	2,457,412.00
Plus: 10% for contingencies	245,741.00
TOTAL INITIAL CONSTRUCTION COSTS	2,703,153.00
Resurfacing at end of 15 years	660,000.00
Maintenance cost for 30 year service life @ $600.00 per mile	1,188,000.00
TOTAL COST - 30 YEAR SERVICE LIFE	4,551,153.00

Item	Cost
ANNUAL AMORTIZED COST @ 2% INTEREST	202,981.00
ANNUAL STATE COST WITH FEDERAL AID	$116,085.00

BENEFITS TO TRAFFIC

The motoring public will benefit from the construction of this route through shortened distance, improved roadway surface, improved alignment, reduced gradient, elimination of traffic stops and reduced travel time. These savings are divided into two main categories; mileage element savings and time element savings. Mileage element savings comprise the direct vehicular operating expenses, and time element savings are composed of driver's time and other indirect savings to the motorist. The amount of these savings are as follows:

Mileage Element Savings

Distance Savings. The local traffic will save about 9.5 miles over the proposed route as compared with present roads. Through traffic will save an average of 18.2 miles by traveling directly from Sidney to Circle instead of from Sidney to Glendive to Circle.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$32,118.00	$29,289.00	$61,407.00

Surface Savings. Local traffic will benefit through the improvement from present unimproved, graded and drained or graveled roads to primary oiled standards. No surface savings will be realized by through traffic since both the proposed route and the present traveled way have oiled surfaces.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$44,612.00	-0-	$44,612.00

Alignment Savings. Local traffic will experience the greatest benefit from improved alignment, however, a slight improvement will be realized by through traffic.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$6,083.00	$1,192.00	$7,275.00

Rise and Fall Savings. The present road, for the greater portion, follows the natural ground and has considerable vertical curvature that should be eliminated by the new construction. Rise and fall is expected to be about the same for through traffic.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$776.00	-0-	$776.00

Gradient Savings. The average gradient for local traffic will be reduced by the new construction. No improvement is expected for through traffic.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$1,987.00	-0-	$1,987.00

Traffic Stop Savings. By traveling directly from Sidney to Circle, through traffic would be able to eliminate the traffic stops and delays ordinarily encountered on the route through Glendive. No improvement would be realized by local traffic.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	-0-	$228.00	$228.00
TOTAL MILEAGE ELEMENT SAVINGS	$85,576.00	$30,709.00	$116,285.00

TIME ELEMENT SAVINGS

Both local and through traffic will be able to save considerable time by traveling over shorter distances, improved surfaces, improved alignment and gradient, etc. These savings will be direct savings to commercial transportation which will be reflected in reduced driver's cost and lower operating time for truck equipment. The same direct savings will apply to commercial passenger car operation such as traveling salesmen, etc. It is more difficult for the average passenger car driver to realize that such savings exist since much of the driving may be done for pleasure, with time as a minor consideration, however, such time savings do exist and have been included in these computations at a reduced rate.

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$70,274.00	$10,676.00	$80,950.00

It will be noted that the local traffic experiences the greatest time savings. Through traffic saves time because of shortened distances only whereas the local traffic saves time because of shortened distance and also as a result of the great improvement in roadway conditions between the present substandard roads and the oiled primary road.

COMBINED MILEAGE AND TIME ELEMENT SAVINGS

	Local Traffic	Through Traffic	Total Savings
Amount of Savings	$155,850.00	$41,385.00	$197,235.00

CONCLUSIONS

As stated in the foreword, the purpose of this report is to analyze and compute the amount of revenue from traffic, the value of benefits to traffic and the cost of constructing and maintaining the proposed route. By comparing the annual revenue from traffic with the annual cost of constructing and maintaining the route, it is possible to determine the degree of financial solvency that exists. By comparing the same costs with the value of savings to the traffic, it is possible to determine whether the proposed construction is economically sound. The ratios between these factors are shown in the accompanying table.

COMPARISON OF REVENUE AND SAVINGS TO COSTS

Comparison of Factors	Annual Amount	Ratio
$\frac{\text{Revenue}}{\text{Costs}}$	$\frac{\$\ 29{,}175.00}{116{,}085.00}$	0.2513
$\frac{\text{Mileage Element Savings}}{\text{Costs}}$	$\frac{116{,}285.00}{116{,}085.00}$	1.0017
$\frac{\text{Time Element Savings}}{\text{Costs}}$	$\frac{80{,}950.00}{116{,}085.00}$	0.6973
$\frac{\text{Combined Savings}}{\text{Costs}}$	$\frac{197{,}235.00}{116{,}085.00}$	1.6991

Note: Costs are net costs to the State Highway Department based on Federal participation at current rates.

REMARKS:

1. For each $1.00 invested by the State Highway Department in construction and maintenance on this route, only $0.25 can be expected in revenue to meet these costs.
2. Each $1.00 invested in construction and maintenance by the State Highway Department will result in savings of $1.70 to the motoring public.
3. Annual revenue of $29,175.00 will not be sufficient to meet annual maintenance costs of $39,600.00.